DOCUMENT RESUME

ED 116 795 PS 008 252

AUTHOR Shantz, Carolyn Uhlinger
TITLE Communication Skills and Social-Cognitive Development. Tech Report Series Report No. 7.
INSTITUTION Wayne State Univ., Detroit, Mich. Center for the Study of Cognitive Processes.
PUB DATE Jul 75
NOTE 18p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Denver, Colorado, April 10-13, 1975)

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS Age Differences; *Cognitive Development; *Communication Skills; *Elementary Education; Literature Reviews; Perceptual Development; *Preschool Education; Research Design; *Role Perception; Social Development
IDENTIFIERS Information Processing (Psychological); *Referential Communication; Role Taking

ABSTRACT

This paper reviews nine studies which report conflicting results in assessing the relationship between children's role-taking ability and communication skills. The studies included satisfy three criteria: (1) role-taking and communication efficiency are measured independently; (2) tasks used to measure the two skills are significantly different in content and type of response required; and (3) abilities are related with chronological age held constant, either by examining the relation between skills within age groups, or by partialling out chronological age. Three studies show consistent, significant positive relationships between communication performance and role-taking, four studies have mixed results (showing some significant results and some nonsignificant results), and two studies show consistent, nonsignificant relationships between the two abilities. Conflicting results are attributed to (1) some third variable (e.g., intelligence) with which role-taking and communication are related independently, (2) statistical factors such as reliability of the tasks, (3) differing methods of measuring the two abilities, and (4) other variables besides role-taking ability which may determine communication skill. Language development, spatial role-taking skills, perspective-taking, and patterns of children's errors during tasks in these areas are discussed as they apply to the relationship between role-taking and communication. (BRT)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED116795

Studies in Intellectual Development

Tech Report Series

Report #7
July, 1975

CENTER FOR THE STUDY OF COGNITIVE PROCESSES

Communication Skills and Social-Cognitive Development

Carolyn Uhlinger Shantz

PS008252

WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN 48202

Senior Staff
Eli Saltz, Program Director
Director, Project A: Training for Fantasy Play in Disadvantaged Children
Edward Meade, Director
Project B: Verbal Control of Impulsive Behavior in the Classroom
Carolyn Shantz, Director
Project C: Development of Social Cognition

00002

Communication Skills and Social-Cognitive Development

Carolyn Uhlinger Shantz

Wayne State University

What evidence is there for the frequent assertion that children tend to be poor communicators because of their inability to make inferences about their listener(s)? There is a great deal of face validity to the notion that efficient communication is intimately related to the speaker's adaptation of his message to the needs and abilities of the listener, and a good deal of empirical data which have been interpreted as clearly supportive of a strong relation.

Recent reviews of developmental research of the last decade on role-taking ability (Shantz, in press) and on communication ability (Glucksberg, Krauss, & Higgins, 1975) have pointed out two problems evident in much of the research typically cited as supporting a strong role-taking/communication relation. First, both variables--role-taking (or, conversely, egocentrism) and communication efficiency--are measured from the same data, the message the speaker gives. As Glucksberg, Krauss, and Higgins (1975) note, virtually any poor message could be characterized as egocentric, and any egocentric message judged poor in informational value (i.e., personalized, redundant, lacking criterial information, etc.). What is needed is independent assessments of role-taking ability and communication ability if a relation between the two is to be clearly tested. Secondly, several studies have taken groups of children of widely varying age and with independent assessments of role-taking and communication ability have found significant, positive relations between the two, sometimes accounting for upward to 50% of the variance. The fact is that each ability increases with increasing age, and a relation between the two may not be a strong functional relation, but

Paper presented at the symposium, "The Development of Social Inference in Children," at the biennial meeting of the Society for Research in Child Development, Denver, Colorado, April, 1975.

reflect their joint relationship to chronological age.

In order to avoid these sources of confusion in the literature and to provide a clear test of the relation, I have selected studies which (1) independently measured role-taking and communication efficiency, (2) have used tasks which are substantially different in content and the type of response required, and (3) have related the abilities with CA constant either by examining the relation within age groups or by partialling out CA. The second criterion is worth elaborating on. One might independently assess role-taking and communication but have tasks that are so highly verbal that any correlation between them might be due more to that factor--shared method variance--than the two conceptual abilities being tapped. For example, some frequently used role-taking tasks such as telling a story to a set of pictures and then retelling it from a "naive" person's viewpoint, or predicting a game opponent's strategies are so highly verbal in their demands as to be poor candidates for the criterion of meximally different methods between tasks. One role-taking task which has low verbal demands is the spatial perspectives task, usually a modification of Piaget's three-mountains task. Here both the content of the problem (spatial relation between the observer's location and his perspective) and the type of response (nonverbal, usually selecting a photograph to show the perspective) provide substantial differences from verbal communication problems.

Studies which have assessed the role-taking/communication relation using the spatial task for the role-taking measure, have most often used one of the following communication tasks: Glucksberg and Krauss' "Stack-the-Blocks" task (1967) or Cowan's checkerboard task (1967). Since they may not be as familiar as the spatial role-taking task, a brief description is given. In these two referential communication tasks a speaker describes something for a listener to select from a set.

The speaker and listener can not see one another, and usually the listener is free to ask for clarification. Both of the tasks can be scored in two ways. First, dyadic performance is measured by the number of correct matches between the item the speaker describes and the one the listener selects; performance, then, is a joint product of speaker adequacy and listener adequacy. Second, sometimes only speaker adequacy is measured by counting the number of criterial attributes in the message. The major differences between the tasks is the use of low-codable nonsense designs in the Glucksberg and Krauss task, whereas the checkerboard task employs familiar toy objects and geometric figures. Also, in the latter task the speaker not only describes the object selected but the location on the checkerboard where it is placed.

There are nine studies which meet the three criteria of independent assessment of communication and role-taking, analysis of the relation within age groups (or CA partialled), and the use of tasks which have little in common as methods, as shown in Table 1. Three of the studies show consistent, significant positive

---

Insert Table 1 about here

---

relations between communication performance and role-taking (Berner, 1971; Cowan, 1967; Rubin, 1973), in various samples of children ranging from preschool to 11 years of age. There are four studies which had mixed results: some significant, positive relations between the variables (as variously measured), and some nonsignificant relations (Ceresnie, 1974; Coie & Dorval, 1973; Kingsley, 1971; Shantz, 1975). For example, Kingsley found significant positive relations for third graders but not kindergarteners, etc. And, finally, two of the studies showed consistent nonsignificant relations between role-taking and communication (Looft,

1972; Steinlauf, 1975). The nine studies add up to a mixed scoreboard! What are such conflicting findings due to? An analysis of the studies was attempted to answer that question. Might the positive findings reported in some studies, for example, occur only for particular age groups, or for one sex but not the other, or when one type of communication task was used? Unfortunately, no such single factor emerged across studies from the analysis to partially resolve the discrepancies.

How should these conflicting findings be interpreted? First, the positive correlations that occurred in some of the studies will be considered. It is possible, as some have suggested at times, that significant positive relations are spurious, the result of some third variable which role-taking and communication are each related to independently. The most popular nominee for that variable is usually intelligence. Few of the cited studies have examined performance in relation to IQ, but in general, intelligence has not been found to be strongly related to performance on either role-taking tasks (Shantz, in press) nor to communication performance (Glucksberg, Krauss, & Higgins, 1975). Chronological age is an unlikely candidate as a third variable influencing the correlations since in each of these studies CA was controlled. The fact that seven of the nine studies indicated positive relations--consistently or in part--between role-taking and communication should be viewed in the context that these two variables were assessed by maximally different methods. As such, some confidence can be placed in the correlations not being largely due to shared method variance. At the same time, the general findings of these studies should not be viewed as a definitive statement of the relation between the two variables for to do so would assume that spatial perspective ability is representative of general role-taking ability, and performance on these communication tasks represents general communication

ability, somewhat shakey assumptions.

Now to consider the negative findings of some studies. At first glance, they might be quite discouraging in supporting a relation that appears--on the face of things--so obvious. But there are several points that bear mentioning. First, there are several factors which might well produce a higher incidence of negative findings than positive ones. A lack of relation between two variables can be a function of some simple statistical factors such as low reliability of the tasks or little variability in performance. Since the reliabilities of the tasks and the score distributions are seldom reported in these studies, this possibility can not be evaluated.

Also, in relation to the negative findings there is an interesting issue of whether role-taking and/or communication performance is being measured in a sensitive way. Specifically, most researchers have taken the "test-score" approach, as Wohlwill (1973) calls it, in which the individual's performance over a set of items is measured and the number of items passed is summed. The assumption is made of a latent continuous dimension of ability (role-taking ability or communication ability) with different amounts of that ability being expressed by different numbers of items passed (for example, the number of locations in the perspective-taking task). If this is a correct assumption, the responses will tend to form a normal frequency distribution. If the items are from a restricted set (e.g., items representing a particular concept like conservation), responses to different items are highly interdependent. The continuous underlying dimension is non-existent, and a bimodal distribution of responses may well result. In such a case the "number-of-items-passed" type of data gives a false quantification feel to what are basically qualitative data, or category data. Most importantly, they may obscure the very qualitative data one might wish (or a theory might wish) to

take as critical. But, to my knowledge, no researcher has taken this more qualitative approach and scored performance in terms of levels or stages on either of the tasks to determine the relation between the two tasks.

Suffice it to say in summary, that of those studies which provide actual correlational data within age groups, the role-taking performance seldom accounts for more than 25% of the communication performance variance. What other factors might well determine communication performance besides the ability to take into account the listener's informational needs? At a minimum, two: perceptual discrimination of the distinctive features of the referent from the non-referents in the set shared by the speaker and listener, and vocabulary factors in labeling such discriminated features. The child's ability to analyze and compare the designs to figure out what needs to be communicated about is clearly involved in the Glucksberg and Krauss task, and is a discrimination ability shown to be deficient in preschoolers (Dickson, 1974; Longhurst & Turnure, 1971). That is, with young children, using rather complex nonsense designs may produce poor communication as much from inadequate discrimination skills as inadequate role-taking abilities. Likewise, vocabulary to encode the discriminated features contributes to communicative performance. The issue of perceptual and linguistic factors is not likely as important, however, in tasks using highly discriminable, familiar objects as in the checkerboard task. Although, even here, when Kingsley used meaningful stimuli (schematic pictures of faces), children's ability to perceptually match them related to their performance in communicating about them around .50 to .55. The degree to which role-taking, perceptual discrimination, or vocabulary determine communication performance probably varies somewhat with the type of communication tasks involved (e.g., information giving, persuasion, etc.). Perhaps it is well to forgo the question of whether role-taking skills relate to communication

adequacy, and ask instead, "How do they and other factors relate to communication performance?"

The final part of this paper is directed in a much more speculative way at the developmental role-taking aspects of communication performance. Are there sequential aspects to adaptive communication? There appears to be little theory or data directed at this question. In order to make some guesses about children's increasing ability to analyze their listener(s), data from another type of role-taking will be used. To the extent that role-taking is involved in communication, sequences found in taking the listener's viewpoint might well parallel sequences found in taking the viewpoint of an observer in a spatial task, or analyzing an opponent in a game. At least in formal respects, it seems unnecessary to propose a psychologically different process for listener inferences than inferences about people in other roles than that of listener.

Some of the research in spatial role-taking, in particular, is pertinent to the question of sequential inferences. There is evidence that children of different ages behave <u>as if</u> they are asking themselves different questions about the other person's visual experience when viewing an object(s) at a different location than the "self" (Shantz, in press). The questions can be most succinctly abstracted in the following form and sequence: (1) Does the other see <u>something</u>? (2) Does the other see the same thing I see or something different? (3) <u>What</u> exactly is it he sees? (4) <u>How</u> does it appear to him? (that is, what is his perspective?). In short, the "content" of the questions goes from <u>what</u> the other is visually experiencing (questions 1-3) to the more specific <u>how</u> it is being experienced; and the contents are linked by a process of determining similarities and differences in self and others' visual experience.

Evidence for the sequence of content comes from a variety of sources.

Flavell (1974) and Masangkay et al. (1974) have analyzed spatial role-taking in very young children as evidencing a sequence from Level 1, as Flavell calls it, in which the child's focus is on what object the other sees or doesn't see, to Level 2, the perspective the other has. There is much more anecdotal evidence, also, that young children construe the examiner's request to find a picture that represents how objects in an array appear to a differently-positioned person as a request to find a picture that shows what the other sees. Confronted with several photographs from different positions, the young child may refuse to select any single one, objecting that they are all correct since all the photographs show three mountains.

A study by Coie, Costanzo, and Farnill (1973) gives support to the what-to-how sequence by examining the types of errors made by children aged 5 to 11 on the spatial task. The group data indicated that within each grade the least frequent error showed children had difficulty representing what objects or parts of objects were visible to another person, then how those objects appeared to another (shape changes as location changed), and, less relevant to this discussion, highest errors on right-left reversal. Importantly, the sequence was supported in individuals' data: 84 of the 90 subjects conformed to the sequence of what-to-how in the types of errors made.

To what extent is there evidence that children use a process of finding similarities and differences of what a person sees and how it is seen? Some work by Selman (1971) on preschooler's reasoning about the thoughts and knowledge of others is relevant. One of the tasks asked that the child infer what another child would select in a simple choice task which the child, himself, had just performed. The results were analyzed by Selman as indicating a sequence of levels: level A behavior suggested that the child had a sense of the other but

did not distinguish between thoughts of himself and the other's thoughts. For example, when the child was asked what the other child thought was the right answer in the choice situation, the child-subject really answered the question, "What is the right answer?" At level B the child clearly distinguished his thoughts from the other's but now did not see any communality between his thoughts and the other person's (e.g., "I can't read his mind!"). It is as if the child, who now clearly understands the other may not have the same thoughts as himself, overstresses that difference and thinks he can make no attributions to the other at all, so great are their differences. At level C the child attributed his own thoughts to the other person by putting himself in the other's position. Given a sameness in situation with the other, he naively assumed sameness of his thoughts and the other's. Finally, at level D, performance suggested that the child was aware that the other may or may not have thoughts similar to his own, that is, that the other's choice would be based on the other's own reasoning, preferences, etc. It would appear, then, that the child evolves in his interpersonal thinking from a naive assumption of high similarity to the other, to high dissimilarity, to similarity based on sameness of situation, to a much more relativistic understanding of possible similarities and differences between himself and the other.

Some corroborating data to this sequence are suggested by the patterns of errors Shantz and Watson (1971) found on the spatial task in this same age group: preschoolers. The most frequent error was the egocentric error in which the child assumes high similarity, not to say identity, between his perspective and the other person's. But the second most "popular" error was an impossible perspective in which objects on the landscape had been rearranged and photographed. The high frequency of this error suggested that children who made it had some notion that the other saw something different than they (and hence, rejected the

egocentric photograph), and assumed either that the other had a totally different viewpoint and/or adopted the strategy of finding the most different photograph in the set. Much less frequently made errors were those which had correct inter-object relations (which, of course, the impossible photograph did not) but were incorrect for the location of the observer.

In summary, it is being suggested that there is with increasing age an increasing specification of another's viewpoint: Does the other see something? If yes, is it the same thing I see or something different? If different, what exactly is it he sees? It appears in ontogenesis that then the child makes the fundamental distinction between what and how, and the sequence of questions is repeated on the content of how objects appear to another: Does the other have a viewpoint? If yes, is it the same as my perspective or different? If different, what exactly is his viewpoint?

This increasing specification of another's exact visual experience indicates a series of information-processing questions and a what-to-how sequence that start out at a very global level. As such, it is in keeping with children's tendency to simplify information and simplify the processing of it which is observed in other, non-social cognitive areas. For example, the request to children to order a series of sticks of varying heights from shortest to tallest presumably involves comparing each stick to its neighbor, being taller than one and shorter than the other. But young children manage to escape such complexity very easily: they turn the seriation problem into a category problem--putting the "short" sticks together in one group and the "tall" ones together in another (Inhelder & Piaget, 1964). Another example is the observation of some children's response to a typical conservation problem in which liquid has been poured from one container into a differently-shaped container, and the child asked, "Is this the same

amount of water?", only the child construes the question as "Is this the same water?" As this construing suggests, the latter question is a much simpler question than the former for children to answer (Bruner et al., 1966).

Now what application might such a sequence of contents and questions have to communicative problems? It is suggested that there is sufficient unity to the role-taking process, or parallel development in different areas, that the child uses the same simplifying procedures and sequence of questions about his listener. First, "Does the listener know or think something?" That is, the child who answers this question affirmatively understands that covert events of thinking and knowing in other people do exist. Secondly, "Does the listener know what I know or think what I think?" If the child assumes high similarity and answers "yes," one would expect typical egocentric communications in which personalized words, many indefinite articles, omission of critical information, and the like, to occur. If the answer is "no," the child presumably would attempt some gross analysis of the listener's knowledge and thoughts, or, he might presume such extreme differences in knowledge, as Selman's level B performance suggests, that he would refuse to make any inferences about the other's thoughts. Lastly, the child behaves as if he is asking the question, "What exactly does the listener know and think?" At this point one would expect attempts to modify one's message for the particular listener and a sensitivity to feedback from the listener as to whether the message just given was understood.

It should be made clear that an ontogenetic developmental sequence is being proposed here. In addition, and in the Wernerian tradition, the sequence in ontogenesis may well parallel the sequence used by the mature individual in a single act of role-taking such as inferring another's spatial perspective, a listener's viewpoint, etc, i.e., a microgenetic sequence. The series of questions proposed

as occurring microgenetically is highly similar to the main outlines in signal detection model of adults, as in processing radar screen information: Is there a signal? Is that signal the same as a plane's signal or different? If a plane signal, what kind of plane? But it should be clear that in some respects the sequence itself proposed here is purely logical: one has to establish the occurrence of an event, only then to identify it, and only then to explain it. But there is the empirical question of whether these are the questions children ask, or more correctly, behave as if they are asking in the communication situation, and the empirical question of what answers they give to these questions in ontogenesis. For example, Selman's data (1971) suggest that for some time the child's answer to the question, "Does the other think the same thing as I or something different?" is not only different, but "totally different," the assumption that one can not attribute any thoughts to another.

Suffice it to say that by probing what the child is capable of asking and inferring, and examining the interpersonal situations where, in fact, he does use such competencies may offer an avenue to more useful subunits of analyzing the communication process than the global concept of "taking the listener's role." In such information-giving tasks, as well as in tasks of persuasion, the analysis of the speaker's inferences about his listener may then contribute to a more coherent picture of inferences about others' thoughts, needs, feelings, and intentions--in short, a more integrated view of social-cognitive development.

References

Berner, E. S. Private speech and role-taking abilities in preschool children. Paper presented at the Society for Research in Child Development, Minneapolis, 1971.

Bruner, J., Olver, R., & Greenfield, P. Studies in cognitive growth. New York: Wiley, 1966.

Ceresnie, S. J. Communication and cooperation in dyads of children of varying levels of egocentrism. Unpublished master's thesis, Wayne State University, 1974.

Coie, J. D. Costanzo, P. R., & Farnill, D. Specific transitions in the development of spatial perspective-taking ability. Developmental Psychology, 1973, 9, 167-177.

Coie, J. D., & Dorval, B. Sex differences in the intellectual structure of social interaction skills. Developmental Psychology, 1973, 8, 261-267.

Cowan, P. A. The link between cognitive structure and social structure in two-child verbal interaction. Paper presented at the Society for Research in Child Development, Santa Monica, 1967.

Dickson, W. P. An instructional device for teaching verbal skills through structured interactions between children in a communication game. Final Report, NIE, 1974.

Flavell, J. H. The development of inferences about others. In T. Mischel (Ed.), Understanding other persons. Oxford, England: Blackwell, Basil, Mott, 1974.

Glucksberg, S., Krauss, R. M., & Higgins, T. The development of communication skills in children. In F. Horowitz (Ed.), Review of child development research, Vol. 4. Chicago: University of Chicago Press, 1975.

Glucksberg, S., & Krauss, R. M. What do people say after they have learned how to talk? Merrill-Palmer Quarterly, 1967, 13, 309-316.

Inhelder, B., & Piaget, J. The early growth of logic in the child. New York: Harper & Row, 1964.

Kingsley, P. Relationship between egocentrism and children's communication. Paper presented at the Society for Research in Child Development, Minneapolis, 1971.

Longhurst, T. H., & Turnure, J. E. Perceptual inadequacy and communication effectiveness in interpersonal communication. Child Development, 1971, 42, 2084-2088.

Looft, W. R. Egocentrism and social interaction across the life span. Psychological Bulletin, 1972, 78, 73-92.

Masangkay, A. Z., McCluskey, K. A., McIntyre, C. W., Sims-Knight, J., Vaughn, B. E., & Flavell, J. H. The early development of inferences about the visual percepts of others. Child Development, 1974, 45, 357-366.

Rubin, K. H. Egocentrism in childhood: A unitary construct? Child Development, 1973, 44, 102-110.

Selman, R. Taking another's perspective: Role-taking development in early childhood. Child Development, 1971, 42, 1721-1734.

Shantz, C. U. The generality and correlates of egocentrism in childhood. Paper presented at the Society for Research in Child Development, Denver, 1975.

Shantz, C. U. The development of social cognition. In E. M. Hetherington (Ed.), Review of child development research, Vol. 5. Chicago: University of Chicago Press, in press.

Shantz, C. U., & Watson, J. Spatial abilities and spatial egocentrism in the young child. Child Development, 1971, 42, 171-181.

Steinlauf, B. Role-taking abilities of young children and maternal discipline strategies. Unpublished master's thesis, Wayne State University, 1975.

Weinstein, E. L., & Finley, G. E. Egocentrism, naive psychology and the development of persuasive skills. Unpublished manuscript, University of Toronto, 1973.

Wohlwill, J. The study of behavioral development. New York: Academic Press, 1973.

TABLE 1

STUDIES OF THE RELATION BETWEEN VERBAL COMMUNICATION AND ROLE-TAKING TASKS

AUTHOR	COMMUNICATION TASK	DV	ROLE-TAKING TASK	Ss' CA	RESULTS
Berner, 1971	Glucksberg & Krauss with famil. pict.	Dyad	DeVries' penny-guessing game	3-5	Signif. + relation between communication and RT task
Ceresnie, 1974	Glucksberg & Krauss	Dyad	Spatial perspectives	M=8½	Low-RT dyads significantly poorer communication than hi-RT & mixed dyads
Coie & Dorval, 1973	Checkerboard	Spk	Spatial perspectives	8-10	With age partialled, C/RT r = .58 for boys and .19 for girls.
Cowan, 1967	Checkerboard	Spk & Dyad	Spatial perspectives	8-10	Low-RT dyads poorest communication, mixed dyads middling, hi-RT best on speaker DV; few diff. on dyad DV; no stat tests.
Kingsley, 1971	Glucksberg & Krauss with famil. pict. & designs	Spk	Spatial perspectives & spatial pict. task	5 & 8	No relation for 5 yr. olds; for 8 yr. olds, spatial & communication (a) adequacy r = .63 and (b) information r = .45
Looft, 1972	Checkerboard	Spk & Dyad	Spatial perspectives	Young adults; elderly	No relation between communication and spatial scores for either age group
Rubin, 1973	Glucksberg & Krauss	Spk	Spatial perspectives	5½, 7½, 9½, 11½	Space & communication signif. related with CA or MA partialled (.35); Factor I spatial loading .88 & comm. .73-.84
Shantz 1975	Checkerboard	Spk	Spatial perspectives	6-9	No significant relation with CA partialled for total sample; 7 yr. olds' space and communication r = .68, 9 yr. olds' r = .47; 6 and 8 yr. olds - no correlation.
Steinlauf, 1975	Checkerboard	Spk	Spatial perspectives	5½-7	No significant relation between space and communication scores
Weinstein & Finley, 1973	Glucksberg & Krauss	Spk	Spatial perspectives	5, 9 & 13	Communication adequacy and spatial r = .58 (with no CA partialling or within grade correlation)

00018